MANAGING YOUR WOODLAND

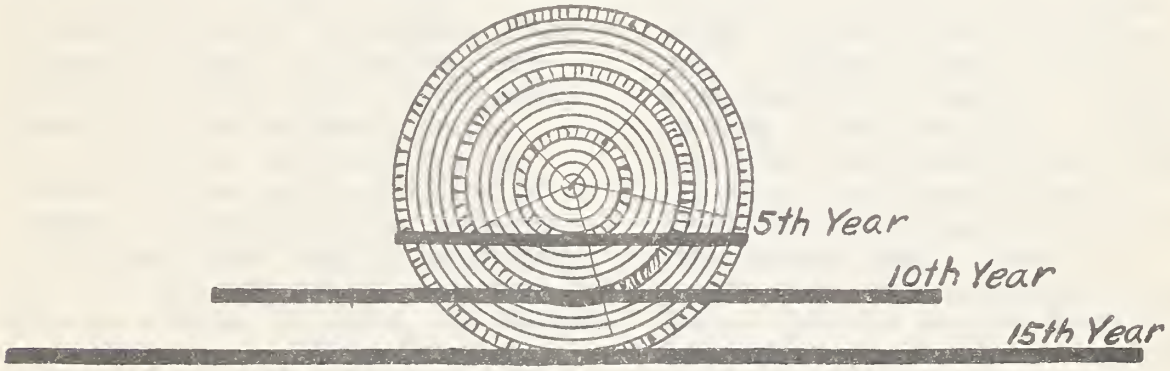
HOW TO DO IT GUIDES

PACIFIC NORTHWEST REGION—STATE AND PRIVATE FORESTRY

No. 2 PORTLAND, OREGON June 1959

INCREASING VALUE AND VOLUME OF FOREST TREES BY A BETTER GROWTH RATE

Your timber has value now. Should you sell it and start another crop of trees? Should you hold it another ten years and then sell it? Can you sell part of the trees in the stand now and have an increased value later? The answers will vary depending on the age, size and rate of growth of your trees. Your local forester can help you decide. He can show you how fast your trees are increasing in volume and in value. He may recommend thinning to accelerate the tree growth. He can show you when the future value of your trees can be increased by pruning.



ANNUAL WOOD-GROWTH INCREASE WITH LOG SIZE
Every 5th annual ring. Annual ring unrolled to show relative wood volume.

Each year a tree grows a new layer of wood just under the bark. This layer or annual ring varies in thickness depending on the vigor of the tree and the availability of water, soil nutrients and sunlight. If these elements are readily available to the tree, only a few annual rings are needed to grow an inch of wood. If too many trees occupy an area, less nutrients are available to each tree and the annual rings on all of the trees will be narrow and more years will be needed to grow an inch

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of wood on each tree. A tree growing at a rate of 4 rings per inch will have twice the diameter and 7 to 10 times the board foot volume of a tree growing at a rate of 8 rings per inch for the same number of years. If a young tree grows at a slower rate than 8 rings per inch, there is an unnecessary loss of volume and value to the woodland owner.

The volume of a tree increases more rapidly in large trees than in small trees when the same number of rings per inch is maintained. This accelerated volume increase in the larger trees is due in part to the greater length of the band of wood put on around the tree. (See diagram on front page.) Larger trees also have greater height so wood growth is formed on more merchantable logs. Individual trees increase in board foot volume very slowly during the first forty years. Thereafter, the volumes increase more rapidly as the diameters increase. A tree grown at a rate of 4 rings per inch will have a volume of 359 board feet when it is 40 years old. If the tree grew at the same rate for another 10 years, the volume would increase to 779 board feet. However, if the rate of growth for the second 10 years was reduced to 8 rings per inch, the volume increase would be less than half as much or about 540 board feet.

As the size and volume of a tree increases, the tree value also increases (see accompanying table of Comparative Volumes and Values of Trees). This table assumes that all logs will have the same stumpage value of $20 per thousand board feet. However, logs from very large crowned trees "wolf trees" develop large knots that produce knotty lumber. Therefore, they are of low value. A sawmill operator will not pay as much for such logs. Large logs, without knots, will produce veneer or high grade lumber. A higher price can be obtained for these logs.

Pruning the limbs on the lower log of the fastest growing and best shaped trees will produce high quality material if the trees are left to grow in size. Since a large proportion of the tree volume is in the bottom log, pruning can greatly increase the value of that log and the total value of the tree.

How can you maintain or increase the rate of growth on your woodland? An acre of land can support only a limited number of trees at a maximum rate of growth. Cutting of some of the trees in a thinning operation and repeating each time the trees crowd each other will permit the remaining trees to grow at the maximum rate. Since the larger trees will increase in value faster than the smaller trees of the same age, it is better to keep these larger fast growing trees in the stand if they are well formed, full crowned trees. Wolf trees, defective or poorly shaped trees, low value species and trees that are crowding better trees should be removed. If each tree is given room to grow throughout its life, all of the trees will increase in volume more rapidly, your woodlands will produce an income sooner, and the land will be producing a maximum volume of forest crops all of the time.

The average number of Douglas-fir trees to keep in the stand varies with the age of the stand and the quality of the growing site. An average number of trees per acre on an average site may be about as follows:

Age of Trees (years)	Approximate Diameter (inches)	Approximate No. of Trees	Average Spacing Between Trees (feet)
10	2 to 4	680	8
20	4 to 8	534	9
30	6 to 12	435	10
40	10 to 16	302	12
50	12 to 20	240	14
60 & over	14+	169 to 90	16 to 22

Check the age and average diameter of the larger trees in your stand and thin to the indicated spacing for a good growth rate. Thinning should be made at about 5-year intervals or at the time the crowns close over previous openings and trees seem to crowd each other.

The tree volumes shown on the next page are those shown in table 25, page 68 of Technical Bulletin #201 "The Yield of Douglas-fir in the Pacific Northwest" by McArdle & Meyer, revised in October 1949, with a supplementary treatment by Don Bruce.

In this treatment, height is more a function of diameter growth than site and age. Volume is shown as a function of average diameter instead of site and age. By frequent thinning to insure fairly even spacing and removal of slow growing trees, the diameter growth rate sought can be obtained for many years. However, assurance cannot be given that growth rates of 4 and 6 rings per inch can be maintained after trees reach the age of 50 years.

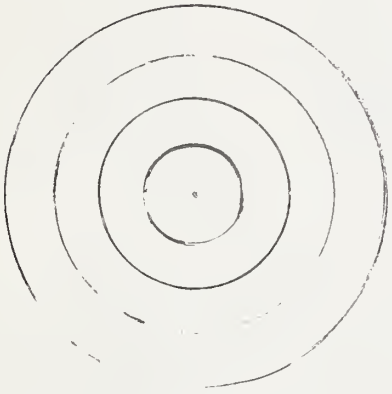
The chart on the following page indicates the results when such growth rates are maintained.

Comparative Volumes and Values of Trees

at 10-Year Intervals with Varied Rates of Growth

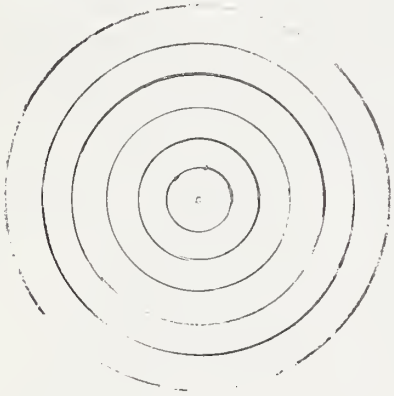
Volumes and heights from table 25, page 68, Technical Bulletin 201, Revised October 1949. Yield based on average diameter.

4 Rings per Inch



Age of Tree	Inches*: D.B.H.	Total Tree Height (Feet)	Vol. in Bd. Ft.	Tree Value at $20/MBM
10	2		0	0
20	7	62	3	.06
30	12	97	99	1.98
40	17	130	359	7.18
50	22	157	779	15.58

6 Rings per Inch



10	2		0	0
20	5	47	0	0
30	8	69	11	.22
40	11	90	67	1.34
50	15	117	236	4.72
60	18	150	429	8.58

8 Rings per Inch

10	1		0	0
20	4	39	0	0
30	6	55	0	0
40	9	76	23	.46
50	11	90	67	1.34
60	14	110	184	3.68
70	16	123	296	5.92

* It is assumed that all trees took 6 years to reach a 4½' height, so diameter growth at that point starts at age of six years.

Revised May 1961